STRATEGY RESEARCH PROJECT

DIGITIZING THE ARMY'S SUSTAINING BASE/POWER PROJECTION WORKPLACE TO SUPPORT FORCE XXI AND BEYOND

BY

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ABSTRACT

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The purpose of this research paper is to develop solutions for digitizing (automating) the Army's workplace using information technology (IT) enterprise management processes for the sustaining base/power projection platform in support of Force XXI and beyond.

This paper explores the idea of IT enterprise management. It analyzes four major IT challenges that affect the way we develop IT enterprise management strategies and implement IT plans for the Army. This research project includes: historical perspective of workplace IT; aligning IT and organizational goals; implementing IT capital planning and investment management; measuring IT contributions to mission performance; and discusses critical technologies required to perform management functions. A review of future technology trends rounds out the research. Recommendations are presented throughout the paper to help managers better understand and effectively develop solutions for improved IT management for digitizing the workplace.

This research paper provides a simple guide of ideas, suggestions and methods for Army managers in planning and implementing digitized workplaces that can meet the demands of Force XXI and beyond.

RESEARCH METHODOLOGY

The research methodology used for this study includes reviews of official government policies and documents; identifying and studying current management processes used in the federal and private sector; and reading and selecting recently published studies, articles and briefings for referencing in this document. The author relied on extensive personal experience from her assignment as the Product Manager of the Army Small Computer Program from 1995 to 1998. As Product Manager, she was responsible for the development and management of more than 20 varied IT contracts used by the Army for annual purchases of more than 350 million dollars of IT products and services. She worked closely with every major Army organization and many industry leaders in developing IT requirements and IT procurements. She is a leading expert on IT management issues concerning the Army.

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I. INTRODUCTION

"We must have information superiority: the capability to collect, process and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same."[1]

Imagine this: Every unit in the Army has the authority to buy whatever motor vehicle it deems necessary to move equipment and troops in garrison and in war. Some units might be driving Jeep Cherokees or Ford Explorers and others using Dodge Ram pickup trucks instead of today's High Mobility Multipurpose Wheeled Vehicle (HMMWV). Maintenance shops would all be ordering different parts. Each unit would require different training for their maintenance personnel and operators would have to become familiar with a new vehicle with every change of duty station.

Imagine this: Every unit in the Army buys their own radios. No more standardized Single Channel Ground and Airborne Radio System (SINCGARS) for every unit. Instead, unit commanders decide what is best for their own organization. Maybe the unit will be able to talk to other units, but, then again, maybe not. And what about the wide variety of support contractors that will become part of the logistics tail associated with all these unique systems? It does not sound too practical.

Imagine this: Every unit in the Army buys its own uniform. Every time a soldier signs in to a new unit, he/she has to buy new pants, shirts, boots and hats. It would get very confusing and certainly quite costly in no time at all.

Now, of course the examples given are far fetched and are not going to happen. They do not make sense. The Army equips its warriors methodically to insure uniformity, realize economies of scale, maximize training resources and minimize logistics concerns. So why not take the same attitude toward digitizing workplaces? The Army has implemented a robust program for digitizing our fighting forces, but has not taken the same robust attitude and applied it to the everyday workplace, the heart and soul of where the Army implements war plans and the start point from where warriors are deployed. There is no standardization across the Army for hardware or software applications. Standards are developed but loosely managed or enforced. Organizations are allowed to buy IT as they see fit, overlooking existing assets and contracts. There are no hard and fast rules that the Army follows for IT management.

In AR 25-1, The Army Information Resources Management Program, the sustaining base is defined as: "The environment encompassing the area and information resources usually located outside of the area of operations. It encompasses the information resources and activities that have the responsibility to raise, organize, train, equip and, eventually, deploy and sustain Army and other assigned forces in the accomplishment of their missions in operational theaters--the theater/tactical environment. The sustaining base includes recruiting centers, training centers, supply depots, maintenance facilities, test facilities, laboratories, long haul communication sites, installations, and command and control facilities. The type of information resources managed in this environment covers all functional areas, less that needed to actually direct tactical forces in the execution of their operational missions in the theater/tactical environment."[2]

Annually, the Association for Federal Information Resources Management (AFFIRM) conducts a survey to identify the top challenges faced by federal agency Chief Information

Officers (CIOs). The survey is distributed to a broad range of IRM officials, not just CIOs. The 1998 survey showed little change over the past three years and shows that IT management is the chief concern of IT professionals.[3]

Four of the challenges identified in the AFFIRM survey are discussed in this research paper. They are:

1. Aligning IT and organizational goals.
2. Implementing IT capital planning and investment management across the agency.
3. Measuring IT contributions to mission performance.
4. Critical technologies required to perform management functions.[4]

Section III of this paper describes and examines each of these challenges, focuses on their importance to digitizing the workplace and applies recommendations for managing them.

II. HISTORICAL PERSPECTIVE

IT has rapidly grown and gained importance since the introduction of the personal computer (PC) to the workplace about 18 years ago. What was once considered a "nice to have" tool to help process work, is now an indispensable tool. What was once considered a luxury only afforded with extra money at the end of the fiscal year, is now a high priority in the normal budget process of most offices. The growth of IT has enabled the Army to improve productivity but, at the same time, it has created challenges for management. Managers are faced with critical IT decisions of what, how and when to buy. Management struggles to identify the right support services and training and the right mix of people to support the IT mission. Management is finding that fulfilling IT requirements is just as important as deciding priorities of office projects or personnel assignments.

Today's workplace is much different than that of ten years ago or even just three years ago. Technology controls almost every function from preparing memos and creating briefing charts to voice mail and e-mail. Today's Army office can be found in a continental U.S. (CONUS) garrison environment or not far from a battlefield. It can be in the Pentagon, in a leased building, in an old barracks building or in a tent. It can be found in almost any country you can imagine. Workers are more mobile than ever before. It is the norm today to see people traveling by airplane or train carrying their laptop computers, talking on their cellular telephones or receiving messages on their pagers. All these situations require a seamless global connectivity to communicate effectively with one another from the workplace to the battlespace. As Army missions increase, manpower decreases and budgets shrink, IT will be called on to perform

functions at more locations, require improved connectivity and demand more portable platforms and standardized support packages.

In 1999, the Army is focusing its attention on the development of weapon systems, logistical modernization and training to prepare the Army for Force XXI. Army IT managers are looking to the future to be sure they can support this new digitized force with the right mix of improved infrastructure capabilities, mobile telecommunications, computers, software and other assorted technologies. IT managers are looking for ways to keep the warrior connected to the sustaining base throughout any future deployment. The tactical Army is developing Force XXI, while the command, control, communications and computer community is developing the Army Enterprise XXI.

"Army Enterprise XXI is all about extending the information superhighway throughout the Army. Enterprise XXI is the Army's overarching plan to build a secure, seamless information network. It is the foundation for achieving information superiority, the organizing principle for Joint Vision 2010 and Army Vision 2010. It will enable battlefield interoperability, network-centric warfare, and linkage to the sustaining base and infrastructure. It is also the enabler for business process reengineering in virtually all functional areas. To be a world-class Army in the information age, they (the Army) must continue to leverage the exploding information technology in the commercial sector and implement best business practices. Enterprise XXI is our vision for making that happen."[5]

"Network-centric" will soon become a commonly used term. This phrase has been coined to describe the way the new digitized Army will communicate. "Network-centric warfare involves placing an emphasis on information-based systems and how that information is shared,

rather than on individual tanks, warships, aircraft or submarines."[6] It also encompasses how the Army will communicate from foxhole to the desktop.

In order for our IT and non-IT managers to get in step with the ongoing digitization efforts and to provide a digitized workplace that can respond to future deployments, they need an understanding of the IT challenges that affect their organizations. Also, they need to see how effective management can produce a digitized workplace and meet the increasing demands of Army missions. Through better understanding of IT challenges and improved enterprise management techniques, they will also be able to improve their ability to stay abreast of technology changes and improve the value of IT investments for the Army.

As the Army grows more dependent on the capabilities that IT provides, the digitized workplace will take on a new look and feel compared to that of today. Today, the normal Army desktop is equipped with a PC with Internet access, electronic mail capabilities and software packages for preparing reports, briefings and developing or accessing spreadsheets and databases. The computers come from a variety of companies and all have different capabilities. Many, but not all, are state-of-the-art. Those not state-of-the-art probably cannot operate with the latest software or access the Internet easily. Many lack the disk drive space or the memory to perform functions required of the new software programs or to download files from the Internet. Because software is not standardized, different versions exist of the same software packages or totally different software packages may be present wherever soldiers are transferred. Incompatibilities exist. This just adds to the confusion and frustration.

Every organization in the Army has different software training requirements, different hardware support requirements and different administration requirements for their IT. This is

inefficient. Every time a soldier or civilian changes organizations, he/she has to become familiar with a new e-mail system, a new word processing package or other software. There is no standardization on hardware. Industry has started to learn the value of standardizing their hardware using a single vendor in order to reduce life cycle costs (total cost of ownership) and improve support response.

III. MANAGEMENT CHALLENGES OF DIGITIZING THE WORKPLACE

IT managers, as well as non-IT managers, are finding that IT affects everything an organization does today or will do in the future. Not utilizing IT to its fullest capabilities and in concert with the evolving Army missions is wasting a valuable resource. It is a resource the Army cannot afford to waste. The success of IT enterprise management relies on understanding and overcoming the challenges IT management presents.

The following sections will look at four IT challenges that are facing the Army today.

A. ALIGNING IT AND ORGANIZATIONAL GOALS

Aligning IT and organizational goals is a fairly new concept and is gaining notoriety and understanding among managers. Business process reengineering (BPR), although not a new concept, is being accepted as a necessary process for creating improvement in the use of IT assets. Although personal computers have been around since the early 1980s, it was not until the late 1980s and early 1990s that the Army made widespread use of desktop PCs. It built extensive local area networks (LAN) and wide area networks (WAN) to connect organizations. Typically, IT purchases were made without the benefit of a strategic plan, a formal implementation process or a vision of how this technology would be used. The growth of desktop technology in the Army was rapid, not leaving much time for planning. Everyone wanted computers and connectivity. Just about everyone got it.

During this evolving IT process, the Army mission changed when the Cold War ended.

The Army faced new missions that deployed soldiers worldwide on short notice to such places as Bosnia, Somalia, Haiti and Saudi Arabia. The Army was called on to support humanitarian and disaster relief missions. This was a new way of doing business for the Army. Throughout this entire period the Army reliance on IT grew. The deployment of computer hardware, connecting the sustaining base with the warrior in the field and keeping the lines of communication open, were just a few of the requirements that became critically important to successful missions.

"In today's environment, senior managers compete among themselves for scarce investment dollars. As a result, investment decisions must be made at increasingly higher management levels by asking the question 'What is the best investment for the agency i.e., what will help agency investments result in increased mission performance?' Investments that do not result in increased mission performance will lose out to those that do. Also there is greater accountability required of the projects. Scarcity of dollars demands more reliable performance. Lower budgets (tighter investment dollars) reduce tolerance for inadequate quality and missed schedules."[7]

Franklin S. Reeder of Government Executive Magazine had this to say about a recent look at the IT operations at several government agencies: "Most agencies had sound strategic proposals and their executive summaries said all the right things about the relationship between IT and their agencies' missions. But when you dug into the details, the proposals were simply about technology (e.g. replace the mainframe or upgrade the phones) and there was no mention of what this technology was going to do to improve the agencies' business. Worse yet, the budgets were presented in such a way that no manager could figure out the connection between what was being spent and the organization's line of business. No one in the organization asked

how the spending related to organizational outcomes or how costs compared to other comparable organizations."[8]

The information age is dynamic and information is transforming the world. Now that the Army is digitizing the battlefield, how can it harness the power of technology for the workplace? The Army is already improving the infrastructure of the sustaining base by increasing bandwidth and upgrading networks to enable cyber information to flow faster and at a higher quality than ever before. But more needs to be done. The workplace needs to be digitized to optimize the power of technology from the sustaining base to the foxhole.

IT is an enterprise asset that needs to function in the best interests of the entire Army. There is a mentality in the Army (not unlike most organizations in the public and private sector) where individual units only worry about their immediate IT needs. Many organization managers think that buying computers should be left to individuals or organizations at the lowest levels or to the "techies" who may or may not understand the mission of the organization. The "techies" are usually more concerned about getting the latest and greatest technology rather than about how the technology will benefit the organization. This type of purchasing is ineffective and costly and does not make sense in this era of downsizing. Managers need to look at all aspects of IT (i.e., procurement methods, consolidating the buying power of the Army and enforcing architecture standards) starting at the Department of the Army level. DA needs to manage these issues down to the lowest levels versus allowing each unit in the Army to make its own IT decisions.

The author of this research paper, LTC Mary Fuller, while serving as the Product Manager of the Army Small Computer Program, observed firsthand how the Army buys IT

products and services. As mentioned earlier, some organizations left the management of technology solely to the technologists. Some office managers' only involvement in buying IT products and services was to sign purchase requests. Many times managers had little or no idea of how the technology they were purchasing would be implemented or why it was needed. Most organizations did not know what IT equipment they had or where it was located (they may have known they had a personal computer (PC) but they probably did not know its capabilities i.e., what software, hard drive and memory it contained). Little or no management of IT assets was witnessed. Asset visibility and accountability are very important to the success of proper IT management. Educating managers in understanding that IT resources (hardware and software) must be an integral part of the overall business management plan for their organization will improve IT asset management and improve IT mission performance.[9]

IT operations need sound strategic management plans that recognize the relationship between IT and agency missions. Management must assert total control and expect accountability for IT performance, Total Cost of Ownership (TCO) and Return on Investment (ROI).

The Army must approach IT management with an enterprise or global view and lead change by leveraging technology. It is important for the Army to grasp the idea of digitizing the enterprise, not just individual organizations, so that economies of scale are maximized. Developing ties with industry to bring the power of technology quickly and efficiently to our desktops needs to be implemented. Developing procedures to lower TCO and raise ROI are necessary.

IT and non-IT managers must overcome their fascination with new technologies. They must justify how the purchase of new products will contribute to increased organizational effectiveness. They must focus on the total IT effort and better control the millions spent annually to keep the existing infrastructure going. Managers cannot afford to focus just on the glamorous new IT systems. Non-IT managers must not let the IT managers make technology decisions in a vacuum. Non-IT managers must understand what the IT plans are and how they affect the mission. Most importantly, non-IT managers need to demand that IT managers provide answers to questions such as: what is the ROI, what is the TCO and what is the value added to the organization of the planned purchase(s)? If managers do not have answers to these critical questions, they should delay any purchase until they do and are satisfied that the purchase is necessary to the organization.

The dwindling Army budget, increasing unit deployments and shrinking personnel resources all point to a greater need for IT to solve to perform a variety of tasks. The time has come for IT to show what it can do besides being a tool for writing memos, sending e-mail and creating briefing slides.

B. IMPLEMENTING IT CAPITAL PLANNING AND INVESTMENT MANAGEMENT ACROSS THE AGENCY

There was a time, not long ago, when Defense Department employees would gladly have used just about any computer that landed on their desks. After all, many did not know anything about computers and their differences. They did not understand the difference between a dumb terminal and a PC or which better suited their needs. Usually, they did not have any say on what was purchased and put on their desks. Managers accepted whatever IT systems were given to them and then figured out how to use the equipment. Today, many IT users in the military have a great deal to say about their hardware purchases. The customer has continually become smarter. In fact, users often help guide the procurement of PCs, workstations and servers in their offices.[10]

Implementing IT capital planning is the key to the success of a digitized workplace and enterprise management. Understanding what IT assets are available and what is needed is the first step. Identifying ways to reduce life cycle costs is the next step. Life cycle cost reduction will be essential to implementation of an effective digital workplace capable of long term support to the Army warrior. The quest for lower TCO rests in the ability to standardize and simplify desktop administration.

A method of reducing life cycle costs resides in the understanding of TCO. TCO is what an organization spends to procure, maintain and operate IT resources. Most activities/ organizations have traditionally only considered the initial purchase price of a computer. Life

cycle costs have only recently been given consideration. The cost of the computer support, training, upgrades and replacement is now beginning to play a role in IT budgets.

Industry experts estimate that overall costs to supply, support, train and maintain each computer user regularly exceeds $10,000 a year. In addition, some analysts believe these costs will nearly double over the next five years if companies do not gain control of the IT environment.[11]

The key to TCO is planning. Planning includes not just considering individual areas of responsibility, but should involve the entire command up through Headquarters, Department of the Army. The Army has immense buying power. Working toward common IT architecture, support, migration, and purchasing plans, would be beneficial because of the ability to make large buys at reduced prices on hardware, software and services. By using desktop management solutions that are now commercially available, further reductions in support staffs and IT budgets would be realized. By including government support contractors in the IT planning process, savings can be increased.

Throughout the Army, many organizations are striking out on their own to develop IT solutions. Individual organizations are constantly developing solutions that are similar or identical to many other organizations, many times only doors away...reinventing the wheel, as they say. These activities are not encouraged to look outside their areas of responsibility to develop solutions that would be more beneficial to the higher command and eventually for the Army Enterprise.

When indiscriminately buying what, where and when users request, the organization will probably pay a higher price. It may not be up front in the initial cost of the computer (but even

then they will usually pay a higher price), but probably in the longer run when considering the TCO. If an organization can standardize on procurement contracts, hardware and software, they will, over time, reduce their maintenance, administrative and training costs. This will ultimately result in improved IT capabilities, as money saved through better IT management will allow the organization to invest the savings in other IT systems, new technologies or in other areas of the organization.

Lowering TCO does not necessarily mean buying from one source and getting the same PC and software for an entire organization. It means having a sound IT investment management strategy. TCO can be realized through a variety of management methods. Not everyone needs the same computer with the same software and printers throughout the Army to minimize TCO. Soldiers and civilians do require the right tools for the right job. Take, for example, an individual or organization that only has a minimal amount of personnel data input responsibility. A low priced computer such as the network PC or network computer may be all they need, as opposed to a high-end Pentium. On the other hand, an organization with engineering requirements for computer workstations will need a different, higher-end machine. A secretary probably does not require a high level of computing power; therefore, giving the secretary a standard, lower priced desktop machine and not upgrading it as often as the higher-end machines can save money.

Improving IT management requires that the IT support team (LAN administrators, technical support, and customer support services) needs to be part of the IT planning process from start to finish. This team needs to know what type of equipment or software they will be required to support. If the team does not possess the necessary skills, they have to be trained. If

the IT support team does not have enough people to do the job, then that issue has to be resolved before implementing the IT plan.

An overall cultural change needs to occur throughout the Army to effectively implement TCO. To efficiently use and buy IT, economies of scale must be maximized. Every organization has to give their IT professionals the authority to implement an organizational IT strategy. But organizational managers must also be involved in the planning, IT budgeting and final IT procurements and understand the overall impact (TCO and ROI) of IT purchases on the organization. New equipment or software may require new training for the users or the maintainers. Loss of workspace is a possibility while new equipment is being installed. The new equipment may not fit in the workspace originally designated, and may require relocating to another office.

The Army can no longer afford to let individual IT managers make purchasing decisions without first agreeing with the operating manager(s) on the cost benefits of the purchase. Managers at every level will have to "buy into" TCO to make it work. They can no longer afford to protect "rice bowls" at the expense of the total organization budget.

Managing TCO is not an easy job. It takes a great deal of understanding and communication up and down the chain of command. It is not an issue for the IT professionals to tackle in a vacuum. It is a management technique for all levels of management to understand and implement. IT capital planning and investment management will save IT dollars and reduce manpower required to support the infrastructure.

C. MEASURING IT CONTRIBUTIONS TO MISSION PERFORMANCE

Since the Army is not a profit motivated organization, it does not worry about returning a profit. Increasing productivity, "doing more with less" and reengineering business processes is where the Army is focusing its attention. These efforts are demonstrating cost savings in most organizations throughout the Army. To think and act more like commercial businesses and to measure ROI is the next logical step for the Army to take in order to realize additional IT savings. Understanding how IT purchases will affect the "bottom line," whether in terms of dollars spent or saved, support personnel required or parts needed are the very issues that face managers daily. ROI poses a new challenge.

There are many methods to measure IT's contribution to mission performance, or ROI. Industry has documented these methods well, but that discussion is another study. Each organization has to develop a method that works best for their business area. ROI can be measured in a variety of ways and, since each organization has different objectives, the "bottom line" may be unique and the measurements different. The point is does IT save manpower, operating dollars or time and can it be validated? Does the organization's plan impact outside organizations? Are its LAN administrators and/or IT supporting personnel managed outside the organization and paid for by other sources that are not reimbursed? Do software or hardware upgrades require changes to current support? If so, will they increase or decrease the administration workload? Are the LAN administrators prepared to meet the demands? Will they need additional training? Is the purchase compatible with existing systems or will special arrangements be needed to make the system work? Are all systems in the network Year 2000

compliant? These are just a few of the problems that organizations face when they work independently.

Recently, a procurement method to increase ROI for software was implemented in the Army. In an attempt to consolidate the buying power for the Army, an Army Enterprise Agreement was signed with the Microsoft Corporation to provide their popular software products at a reduced price.[12] This is the start of a better way for the Army to do business and realize a great deal of cost savings over time. Enterprise agreements with all major software providers will eventually be the norm. Presently, the Army buys software through large-scale commodity contracts like the Air Force Desktop V and Army PC-2 contracts, blanket purchase agreements (BPAs), small purchase orders from already competed GSA Schedule contracts and through support contractors and direct purchases. In a recent Army Times interview, LTG William Campbell, the Army's Director of Information Systems for Command, Control, Communications and Computers (DISC4) termed current purchasing methods as "inefficient, since it does not always guarantee DoD the lowest possible price. Instead of having different units obtain popular software products on a piecemeal basis, the Pentagon wants to find a way to buy DoD wide licenses, so all 2.1 million military and civilian employees in the military services and defense agencies would have easier, more cost effective access."[13] The DISC4 is currently working with the Office of the Secretary of Defense on developing enterprise licenses for DoD.

Buying in a larger-scale, more cohesive fashion will offer the military significant dollar savings, among other benefits. "The more users they have, the more leverage they have when it comes to negotiating prices," says Major Luwanda Jones, an action officer in LTG Campbell's office. "But you're not only looking at saving on the price of the actual software package; they

would expect to save on costs involved in acquisition, processing, distribution and tracking as well."[14]

D. CRITICAL TECHNOLOGIES REQUIRED TO PERFORM MANAGEMENT FUNCTIONS

New IT technologies are discovered almost everyday. The rapid pace of implementing new technologies has become overwhelming for many people. It seems that as soon as you learn to use a new piece of IT equipment or software it is replaced with a new or improved version. This is frustrating, but a fact of life. The new technologies are important to the future of the digitized workplace.

The newest technology that is making a great impact on daily lives is electronic commerce, or simply put, buying via the Internet. Although a relatively new technology, it is quickly taking hold. The Army is making a big push to make electronic commerce the standard for purchasing products. Commercially, electronic commerce appears to be an initial success with such online buying services as Amazon.com, BarnesandNoble.com and Ebay.com. It is obvious, by the recent proliferation of government web sites, that the government is not far behind industry in capitalizing on the efficiencies and the marketing potential of the Web. The DoD and Army have created several electronic web sites (i.e. http://www.emall.dla.mil, http://pmscp.monmouth.army.mil, and http://www.efed.com) for buying everything from computers to building supplies. Although these online purchase programs are in their early

stages, they will certainly be a formidable buying force in the near future if they have comparable success to their industry counterparts.

Most of the companies doing business with the government have web sites that allow the use of credit card purchases over the Internet. With the push to make more purchases using government credit cards, online (electronic commerce) ordering is becoming the easiest and preferred method of purchasing small IT materials. Digital signature technology is making great strides. The government is working on developing digital signature standards that, if applied, will enable users to send signed documents over the Internet. Soon, soldiers and civilians will be able to process most financial, personnel or administrative actions online.

The growing reliance on government-industry partnerships to improve business practices dictates that the Army must be more electronically connected to industry. PMs, government and industry contracting organizations and government suppliers rely heavily on the use of the Internet. The Internet is increasingly used to download latest versions of software, send and receive drawings, submit and accept engineering change proposals, process requests for bids and conduct online meetings via video, to increase productivity and decrease costs. These capabilities reduce IT administration time, decrease coordination time, save postage, reduce travel and result in an overall increase in productivity for both industry and the Army. It will become increasingly important for the Army to have standards that can be relied upon by industry. Today, industry has to be very flexible. For example, a major defense contractor may have a dozen contracts with a dozen different program managers (PM). Each PM may be using either a different brand or version of a word processing package. The defense contractor then must adapt to each of its customers at a cost that ultimately the government pays.

All of this talk about electronic commerce and e-mail reminds us that both require an Internet connection, which has become an integral part of our daily lives. No office is complete anymore without Internet access. The Internet is the backbone that connects our electronic offices. It is the central point where anyone can buy online and access information on any subject imaginable. It serves as the conduit for quickly finding and passing information. Yet today, some offices still do not have the connectivity or the computers to access the Internet and download files. Some managers will not allow employees to access the Internet for fear employees will waste valuable time "playing."

The critical technologies that are considered as necessary to conduct everyday work are evolving as fast as we can get them on our desktop. Offices need to be "connected" now and learn to harness this technology. Managers need to be proactive instead of reactive to technology. This will become even more important as Army missions put a greater strain on everyone. A digitized workplace can reduce confusion and bring the battlefield "virtually" closer to the sustaining base.

IV. TECHNOLOGY TRENDS EFFECTING IT ENTERPRISE MANAGEMENT

There is no doubt that with the continual development and rapid advances of digital desktop technologies that business practices will continue to change for the better. Paperless contracting will be the norm, speeding up the acquisition process. Online ordering and credit card ordering will increase as higher credit limits are established for purchases. With the new technologies currently being developed (faster processors, lighter notebook computers, more efficient batteries, improved storage capabilities, etc.), a seamless integration from the desktop to the foxhole is possible.

Future desktop computing equipment will be as standard and interoperable as telephones are now, whether the worker is located in the typical garrison office, sitting in an airport or working from a tent in some far off country. Workers will easily communicate between far reaching locations with state-of-the-art hardware (notebook computers, palmtops, and hand held devices with modems and satellite links) and software. Wireless communications will change the face of the new mobile workforce. Workers will require Internet access whether in the office, at home or on the road. They will need to have the ability to work anywhere, anytime, just as if they were actually sitting in their office cubicle. Virtual offices will be the norm as telecommuting becomes the norm. Organizations will develop Intranets/Extranets for everything from command and control databases, to leave and earning statements for soldiers to access on the Internet. Travel vouchers will routinely be submitted electronically. Workers will regularly make online purchases using their government credit cards through electronic commerce web

sites to purchase everything from computers and desks to pens, paper and building materials. The office of the future will totally transform the way everyone works.

Computer processor speeds will continue to improve. In 1999, Intel Corporation and Advanced Micro Devices (AMD), the leading processor manufacturers, will release a series of faster processors. Speeds of 533 MHz or better will be released by AMD. Intel expects to release processors capable of speeds up to 700 MHz. Intel and AMD will not be the only chipmakers making news this year. New chips from Cyrix, Win Chip and a newcomer, Rise Technology, will be released in 1999. The ferocious operational speeds of computers will drive industry to develop new software and peripherals capable of using this newfound speed. To keep up with the faster processors, advances in video/graphics boards, removable storage, lower priced LCD monitors, bigger hard drives, faster interfaces and an increase in Internet connection speeds will be developed. [15]

"What does this all mean? While a computer with a 600MHz processor may not be required (at least right now), advances in technology will certainly mean continued price drops on items that are currently in the spotlight as the fastest available. New technology is always a good sign for value conscious consumers as prices drop on older but still totally usable technology; hence today's medium to high-end systems will become more affordable a little later this year. On the other hand, the power hungry should prepare to open those wallets once again this year because, if you want the best, you are going to have to pay for it."[16]

By the start of the year 2000, experts say that, worldwide, one million networks will be connected to the Internet. About 350 million computers will have e-mail access.[17] Although the Army only makes up a small part of these technology statistics, it must react to the fast paced

changes in the technology world or it will be left behind. IT spending forecasts speculate that the DoD will spend approximately 11 billion dollars annually through the early years of the next millenium.[18] Currently, the Army spends about 6% of its annual budget on IT requirements and this is expected to hold for the near future.[19]

A more technical workforce will be required and will need to manage IT assets to increase productivity. With a smaller workforce, extensive reliance on IT will be essential to bring the Army closer together, particularly with soldiers located throughout the world. IT will have to be more mobile, faster and easier to use and support. Most importantly, the IT used at the digital workplace must mirror what will be used in the field.

Technology will continue to grow rapidly with new products becoming available in the next five years that have not even been thought of today. Computers will become faster as the speed of processors double about every 18 months (Moore's Law). The Army has an ongoing project managed by the Project Manager for Defense Communications and Switched Systems to improve and upgrade the existing post camp and station communications infrastructure. This will have a significant positive impact on IT capabilities of the future. It will enable the Army's power projection platform to deploy to far reaching areas of the world without significant impact on its capability to stay connected with the sustaining base resources.

Managing IT assets is a difficult and dynamic job. IT is continually changing and expanding into areas that are unfamiliar to even the smartest of our IT experts. They are continually challenged to understand the direction of their organizations and where IT will fit in. Although no one can predict what technology will definitely be available in the long term, it can be predicted with some certainty what goals organizations are expected to have and what

technologies will probably be necessary to get them there. Technology will continue to be a main driving force for the Army for as far as we can see into the future. As the Army applies more IT solutions to processes, the more important IT support becomes. As it places more technology on desks, management will have to justify the dollars required for purchasing and maintaining the software, equipment and training. Today's shrinking budgets will make it difficult to support the growth of IT. Over time, with proper management techniques including standardized software, hardware and training, budgets will level off. The Army will then be able to concentrate on TCO issues and ROI to insure it gets "the most bang for its buck."

Every year computer users seem to get more for their money. Looking into the next millennium, manufacturers will continue to pack more features into their machines. According to vendors, the following features almost certainly will ship pre-installed as standard equipment in the near future:

- Spacious, on-board backup, such as Zip drives and their successor products.
- Windows NT at the desktop for all users, replacing Windows 95/98.
- High-speed modems.
- Components that enable wireless communication.
- Video teleconferencing features.[20]

A trend in industry is to outsource IT services when IT is not a core competency of the business. Recent examples of this can be found at Microsoft Corporation and General Motors and in some government agencies where leasing computers and associated services (also referred to as "Seat Management") are being implemented. IT is not a core competency of the Army and, with dwindling IT personnel resources, the Army should outsource IT in the digital workplace.

The Army will start to rely more heavily on private consulting services to support IT requirements in order to keep up with state-of-the-art technology. Partnering with industry will become even more important than it is today. Through consulting services and partnering agreements, the Army will be able to stay in touch with the leading edge of technology and apply it to the Army's advantage.

V. RECOMMENDATIONS/CONCLUSIONS

"As information technology companies continue to churn out new technologies, the key challenge for the Defense Department in the dawning of the 21st century will not be to acquire more and better technology to support the warfighter but to better manage that technology."[21]

The ability to communicate from the desktop to the foxhole is available today and in some cases has already been implemented. However, it is essential to work smarter, not harder, at making technology work for the user and to make adequate technology available to the entire workforce. Everyone has a shared responsibility to insure the Army Enterprise does what is best for all, not just for a chosen few. The digital workplace is important to the success of Force XXI and beyond and it is up to IT and non-IT managers to make it a reality.

The Marine Corps, in February 1998, started an 18 month project to develop a worldwide, high-speed network and a new approach to delivering and managing network services. The Marine Corps project goals are to: (1) Increase bandwidth, (2) Reduce the number of firewalls, (3) Increase operational savings and affordability, (4) Centralize all IT purchases, (5) Enforce enterprise-wide standards and (6) Support future warfighting concepts and doctrine.[22] The Marines have seen a need for enterprise management of their IT assets. The Army should take a look at what they have planned and follow their lead.

Managers at all levels need to become more involved in the management of office IT (purchases, training, and support). The Army Enterprise, from the Army's Chief Information Officer down to the lowest levels of office managers, needs to work together to develop Army Enterprise IT management plans which create a digital workplace.

This research paper is not a conclusive study of how to digitize our workplace. This study was intended to make the reader think about where their workplaces stand in comparison to the rest of our Army in the area of IT. The Army has a long way to go before it has state-of-the-art capability at all levels and locations. Until this happens, the Army will not have the ability to properly capitalize on the benefits of IT and will spend more money than necessary. If IT management is approached with a well-developed strategic management plan and a reasonable schedule to implement that plan, the Army stands a better chance of fully leveraging the digital capabilities that are currently within reach.

Some additional thoughts on digitizing the workplace for Force XXI and beyond:

- Leverage Army IT buying power by consolidating all IT purchases.
- Develop and mandate the use of Army Enterprise Software agreements.
- Develop Enterprise policy and enforce it. (A good example would be to require that all government employees have Internet access on their office computers). The Army could also contract for some cost-effective ways of making this happen.
- Require management reporting on IT metrics (i.e., IT annual costs, products bought, contracts used, programs used/developed, etc.).
- Require annual IT plans which are enforced at all levels. No one should make an IT investment until a plan has been prepared and approved for implementation.
- Conduct post, camp and station IT forums. Discuss the IT needs of organizations to insure the infrastructure supports the customers and that adequate support is available to all.

- Mandate the use of Army contracts for IT purchases. (Approval to use other contracts could be granted on a case by case basis based on compelling need).

If the Army is to achieve total information dominance and superiority, it must include the workplace in the plan. If not, then one of the most critical links (sustaining base/power projection platform) could fail when the time comes time to communicate from the foxhole to the desktop. The Army must improve IT asset management and start considering it just as important as the vehicles it drives, the radios it communicates with and the uniforms it wears.

Digitizing the workplace through IT enterprise management has a long way to go and needs to be studied further. Besides implementing the proposed recommendations concerning digitizing the workplace through IT enterprise management, the DISC4 should also establish a consortium with industry to capitalize on industry expertise. With industry's help, the Army should implement a digitization plan for automating their workplaces, so that as soldiers progress down the digital road in tactical units, the sustaining base will not lag behind.

As the Army moves to implement Force XXI, and if it is to successfully reach the vision of the Army After Next, it must put the same emphasis on mastering, utilizing and planning for workplace IT as it currently does for its weapon systems. To achieve information dominance in the 21st century, the Army must implement information technologies providing seamless information flow between the workplace and the battlespace using the methods this research paper discusses and visionary leadership.

ENDNOTES

[1] Department of the Army, *Army Vision 2010,* "Gain Information Dominance, Information Superiority," Department of the Army, 1998, *p.* 17.

[2] Department of the Army, *Army Regulation 25-1: The Army Information Resources Management Program,* Department of the Army, 12 March 1997, p. 3.

[3] Association for Federal Information Resources Management (AFFIRM), "The Federal CIO – Third Annual Top Ten Challenges Survey," AFFIRM online source: www.affirm.org, Washington, D.C., November 1998.

[4] Ibid.

[5] Bleicher, Harvey L., Editor in Chief, "Interview with LTG William H. Campbell, Director of Information Systems for Command, Control, Communications and Computers," *Army Research Development and Acquisition*, Office of the Deputy Director, Acquisition Career Management, Fort Belvoir, Virginia, September-October 1998, pp. 2-4.

[6] Seffers, George I., "Signal Corps Keeps Pace with Technology," *Army Times*, Army Times Publishing Company, Springfield, Virginia, 21 September 1998, p. 38.

[7] Association for Federal Information Resources Management (AFFIRM), "A Resource Paper Supporting Government Reinvention through Strategic IT Investing," AFFIRM online source: www.affirm.org, Washington, D.C., June 1997.

[8] Reeder, Franklin S., "Managing Technology, IT Managers Missing Their Cue," *Government Executive Magazine,* online magazine: www.Govexec.com, May 1998.

[9] Fuller, Mary, LTC, US Army, Product Manger, US Army Small Computer Program, 1995-1998.

[10] Binda, Lawrence, "The PC of the Future," *DoD IT, Army Times Supplement, Army Time,* Army Times Publishing Company, Springfield, Virginia, September 1998, p.5.

[11] Hewlett Packard Corporation, "Total Cost of Ownership Studies for Client/Server Environments," HP Digital Workplace, online source: www.hp.com, March 13, 1999.

[12] Product Manager Army Small Computer Program, Fort Monmouth, New Jersey, online source: http://pmscp.monmouth.army.mil, March 13, 1999.

[13] Hayes, Heather B, "Bulk Buys," *DoD IT, Army Times Supplement, Army Times,* Army Times Publishing Company, Springfield, Virginia, August 1998, p. 5.

[14] Ibid.

[15] Newberry, John, "Speeding in the New Year," Mining Company.Com, online source: www.compreviews.guide@miningco.com, Online, 13 January 1999.

[16] Ibid.

[17] Electronic Industries Alliance, "IT Spending Forecast," *Federal Computer Week,* Federal Computer Week Government Technology Group, Falls Church, Virginia, 14 September 1998, p. 70.

[18] Ibid.

[19] Borland, David, Vice Director of Information Systems for Command, Control, Communications and Computers, "DISC4 Briefing for the Army Small Computer Program IT Conference," 8 December 1998.

[20] Binda, Lawrence, "The PC of the Future," *DoD IT, Army Times Supplement,* Army Times Publishing Company, Springfield, Virginia, September 1998, p. 5.

[21] Elliot, Ronald D., "Better Management Needed for 21st Century Defense," *Federal Computer Week*, Federal Computer Week Government Technology Group, Falls Church, Virginia, 24 August 1998, p. 20.

[22] Verton, Daniel, "Marines to Build Enterprise Net," *Federal Computer Week,* Federal Computer Week Government Technology Group, Falls Church, Virginia, 8 March 1999, pp. 20 and 42.

BIBLIOGRAPHY

1. Army Times, "The PC of the Future," *DoD IT Guide,* Army Times Publishing Company, Springfield, Virginia, September 1998, pp. 4-8.

2. Association for Federal Information Resources Management (AFFIRM), "A Resource Paper Supporting Government Reinvention through Strategic IT Investing," AFFIRM online source: www.affirm.org, Washington, D.C. June 1997.

3. Association for Federal Information Resources Management (AFFIRM), "The Federal CIO – Third Annual Top Ten Challenges Survey," AFFIRM online source: www.affirm.org, Washington, D.C., November 1998.

4. Association of the United States Army (AUSA), *Institute of Land Warfare Army Budget, Fiscal Year 1999,* Compiled by the Institute of Land Warfare, Association of the United States Army, Arlington, Virginia, June 1998.

5. Augustine, Norman R., "Acquisition Reform: Dream or mirage?" *Army Research, Development and Acquisition*, Office of the Deputy Director, Acquisition Career Management, Fort Belvoir, Virginia, September-October 1996, pp. 20-22.

6. Bass, Brad, "Going to the source: Choosing a Seat Management Vehicle," *Federal Computer Week Editorial Supplement*, Federal Computer Week Government Technology Group, Falls Church, Virginia, 24 August 1998, pp. 20-22.

7. Beam, Carrie, Judith Gebauer, and Arie Segev, "Impact of the Internet on Procurement," *Acquisition Review*, Defense Systems Management College Press, Fort Belvoir, Virginia Spring 1998, pp. 167-184.

8. Binda, Lawrence, "The PC of the Future," *DoD IT, Army Times Supplement,* Army Times Publishing Company, Springfield, Virginia, September 1998, p. 5.

9. Bleicher, Harvey L., Editor in Chief, "Interview with LTG William H. Campbell, Director of Information Systems for Command, Control, Communications and Computers," *Army Research Development and Acquisition*, Office of the Deputy Director, Acquisition Career Management, Fort Belvoir, Virginia, September-October 1998, pp. 2-4.

10. Borland, David, Vice Director of Information Systems for Command, Control, Communications and Computers, "DISC4 Briefing for the Army Small Computer Program IT Conference," 8 December 1998.

11. Caton, Michael, "Managed Desktops," *PC Week*, ZD, Inc., New York, New York, 21 September 1998, p. 97-104.

12. Commander, Joint Warfighting Center, *Concept for Future Joint Operations, Expanding Joint Vision 2010*, "Information Systems," Joint Warfighting Center, May 1997.

13. Department of the Army, *Army Regulation 25-1: The Army Information Resources Management Program*, Department of the Army, 12 March 1997, p. 3.

14. Department of the Army, *Chief Information Officer (CIO) Implementation Plan*, Department of the Army, 13 January 1997.

15. Department of the Army, "Gain Information Dominance, Information Superiority," *Army Vision 2010*, Department of the Army, 1998, p. 17.

16. Department of the Army, *The Army Enterprise Strategy Implementation Plan*, Department of the Army, August 1994.

17. Electronic Industries Alliance, "IT Spending Forecast," *Federal Computer Week*, Federal Computer Week Government Technology Group, Falls Church, Virginia, 14 September 1998, p. 70.

18. Elliot, Ronald D., "Better Management Needed for 21st-Century Defense," *Federal Computer Week*, Federal Computer Week Government Technology Group, Falls Church, Virginia, 24 August 1998, p. 20.

19. Fuller, Mary, LTC, US Army, Product Manager, US Army Small Computer Program, 1995-1998.

20. Guerra, Robert, "Gaining Perspective on Seat Management," *Federal Computer Week*, Federal Computer Week Government Technology Group, Falls Church, Virginia, 10 August 1998, pp. 23-24.

21. Hayes, Heather B, "Bulk Buys," *DoD IT Army Times Supplement, Army Times*, Army Times Publishing Company, Springfield, Virginia, August 1998, p. 5.

22. Hewlett Packard Corporation, "Total Cost of Ownership Studies for Client/Server Environments," HP Digital Workplace, online source: www.hp.com, March 13, 1999.

23. Hoeper, Paul J., "Modernization: Making Investments That Will Save Lives and Money," *Army Magazine*, Association of the United States Army, Arlington, Virginia, September 1998, pp. 12-14.

24. Jaffe, Brian D., "Another Reason to Outsource: Good Service," *PC Week*, ZD, Inc., New York, New York, *2* November 1998, p. 99.

25. Kozarn, Linda D., "Designing Digital Defenses," *Program Manager*, Defense Systems Management College, Fort Belvoir, Virginia, November-December 1998, p. 17.

26. Laurent, Anne, "Better Technology Buying," Government Executive online magazine, www.Govexec.com, 13 December 1996.

27. Manes, Stephen, "Those Goofy Computers," *Information Week*, CMP Media Inc., Manhasset, New York, 31 August 1998, p. 106.

28. Manz, Paul C., "The Army Technical Architecture," *Army Research, Development and Acquisition*, Office of the Deputy Director, Acquisition Career Management, Fort Belvoir, Virginia, July-August 1996, pp. 35-36.

29. Newberry, John, "Speeding in the New Year," Mining Company.Com, online source: www.compreviews.guide@mingco.com, 13 January 1999.

30. Office of the Secretary of the Army, Director of Information Systems for Command, Control, Communications and Computers (DISC4), *The Army Enterprise Vision*, Washington, D.C., Office of the Secretary of the Army, 20 July 1993.

31. Pelton, Charles, "Themes of Innovation," *Information Week*, 3 CMP Media Inc., Manhasset, New York, 1 August 1998, p. 108.

32. Pontin, Jason, "Ten Trends for the Post-PC World," *Red Herring*, December 1998, pp. 50-88.

33. Product Manager, Army Small Computer Program, Fort Monmouth, New Jersey, online source: http://pmscp.monmouth.army.mil, March 13, 1999.

34. Reeder, Franklin S., "Managing Technology, IT Managers Missing Their Cue," *Government Executive Magazine*, online magazine: www.Govexec.com, May 1998.

35. Robinson, Brian, "The Leasing Option: The Costs and Benefits of Alternative Financing," *Federal Computer Week, Editorial Supplement*, 24 August 1998, pp. 10-12.

36. Rout, Lawrence, "Thinking About Tomorrow," *The Wall Street Journal Reports Technology Supplement*, Dow Jones & Company, Inc., New York, New York, November 1998.

37. Seffers, George I., "Signal Corps Keeps Pace with Technology," *Army Times*, Army Times Publishing Company, Springfield, Virginia, 21 September 1998, p. 38.

38. Sweat, Jeff, "What's Your ROI?" *Information Week* CMP Media Inc., Manhasset, New York, 24 August 1998, pp. 81-82.

39. Verton, Daniel, "Marines to Build Enterprise Net," *Federal Computer Week,* Federal Computer Week Government Technology Group, Falls Church, Virginia, 8 March 1999, pp. 20 and 42.

40. Walker, The Honorable Robert M. Walker and General Dennis J. Reimer, *A Statement on the Posture of the United States Army Fiscal Year 1999*, Department of the Army, February 1998.